

16th May 1980

# Greenbank Electronics

## Additional Information on Kitbug-MM ('Kø').

General Information on addresses, RAM requirements etc., is given in our leaflet 'SW4'. Operation is generally the same as for the 'Kitbug' program from which Kø is derived, and therefore the booklet 'A Guide to Kitbug' may prove helpful. If you do not have both of these items, please contact us for advice.

Kø is a memory-mapped version of the serial program Kitbug.

The various routines in Kitbug are to be found at similar addresses in the Kø monitor, but they have been modified where necessary to suit memory-mapped operation. The use of the memory-mapping technique for input/output confers the benefits of speed and flexibility, but there is an area where the loss of the serial input/output routines would cause inconvenience, and some additional routines have been included in the Kø monitor to prevent this.

The difficulty would occur if the CLOAD and CDUMP (cassette load and cassette dump) routines in the 'U' ('Utilities') PROM were used. They take advantage of the monitor's GECO and PUTC routines to format the data into serial form, suitable for tape recording via the TPA-2 printed circuit board. As the GECO and PUTC routines in the memory-mapped (Kø) monitor have been modified for memory-mapped operation they are no longer suitable for the purpose of tape recording.

To prevent this resulting in any difficulty, and as a bonus, the Kø monitor includes some additional routines, extra to those advertised: CLOAD, CDUMP, GECO "2", PUTC "2". In summary Kø is as follows:

0000-001F	EXIT Routine	- as for serial Kitbug.
0020-0038	ENTRY Routine	- " "
003A-0055	COMMAND Routine	- " "
0056-00CA	"G", "T", or "M" Routine	- " "
00CC-00DA	ERROR Routine	- " "
00DC-013C	GHEX/GHEX2	- " "
013E-0184	PHEX/PHEX2	- " "
0186-013C	GECO	} Different to serial Kitbug to allow memory mapped operation
015C-031F	PUTC	

### Additional Routines:

0320-035B	CLOAD	- Used with GECO"2" at 3A0
035C-039C	CDUMP	- Used with PUTC"2" at 3D0
03A0-03CF	GECO"2"	- Modified GECO for use with CLOAD
03D0-03FB	PUTC"2"	- Modified PUTC for use with CDUMP

RXD from the tape should be connected to the Sense A line, and TXD (via an inverter, see below) to the F0 line. The baud rate with a 2MHz crystal using these routines is 110 baud, and with a 4MHz crystal it is 300 baud.

The normal convention for recording data and receiving it back, is that the output line is idling high - a low bit being used to indicate start of data. It is therefore necessary to include an inverter in the F0 line, e.g. by using a spare gate inserted between SC/MP pin P19 and the output buffer. To recover the data from cassette pins 6/11 of IC9 on TPA board should be connected to earth.

Acknowledgements:

We are indebted to our customers Mr.K.Longley, and Mr.N.S.Ryan,B.Sc., for their kindness in providing much of the material reproduced above, and their generosity of spirit in sharing their hard-won knowledge so that others might benefit.

D.M.P. 13/2/80

Revn. 16/5/80